

III. *Observations on the Tropæolum pentaphyllum of Lamarck.* By Mr. DAVID DON, *Libr. L.S.*

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THIS curious plant is a native of the regions bordering on the Rio de la Plata, where it appears to be far from rare, as it occurs in most of the collections that we have seen from those countries. It was first discovered by Commerson; and from the materials collected by that indefatigable naturalist, Lamarck was enabled to give a figure and description of the species in the botanical part of the *Encyclopédie Méthodique*, under the appellation of *Tropæolum pentaphyllum*,—a name, it will be admitted, misapplied to a plant whose leaf is merely deeply lobed. Another figure and description of the same plant, but under a different, although no less objectionable name, occurs in an academical dissertation on this genus, by Professor Hellenius, and published at Abo in 1789, a short time after those by Lamarck had appeared. M. Auguste de Saint-Hilaire has likewise given a figure and description of it in his *Plantes Usuelles des Brésiliens*. Notwithstanding these several authorities, the characters of the plant have been hitherto but partially understood; and it was not until its recent introduction to the British gardens that the peculiarities of its structure have been ascertained. In the month of August last, while on a visit at Edinburgh to my much-esteemed friend Mr. Neill, to whom we are indebted for its introduction, I had the pleasure of seeing this interesting plant in flower, and subsequently with ripe fruit, which has enabled me to determine its claims to be regarded as the type of a new genus. The most remarkable peculiarity is in the nature of its fruit, which is a black, juicy berry, not unlike, both in appearance and flavour, the Zante grape. Besides the reduced number of its petals, a character the importance of which I am not disposed to insist much upon, the genus likewise differs in the valvate æstivation of its calyx, (a distinction first pointed out by M. Auguste de Saint-Hilaire,) that of *Tropæolum* being imbricate. Neither of these characters has

been noticed in the figures and descriptions of the plant which have recently appeared in the Botanical Magazine and Register. I am inclined to think that *Tropaeolum dipetalum* of the *Flora Peruviana* will prove to be a second species of this genus, and it is possible that *Tropaeolum* may include the types of other genera, when the nature of the fruit in the different species becomes better known.

The genus *Tropaeolum* was originally included by Jussieu among his *Gerania*; but he afterwards changed his opinion somewhat, in considering it the type of a distinct group; still adhering, however, to his former views of its affinity, by continuing to place it next that family, in which he has been followed by Richard, DeCandolle, Auguste de Saint-Hilaire, and other botanists of deserved eminence. The *Tropaeoleæ* differ in many important points of structure from the *Geraniaceæ*, particularly in the want of symmetry between the stamina and other parts of the flower; in the structure of their stigmata; in their thick, fleshy cotyledons, with the short radicle placed between their lobes; in the conspicuous plumule, by their axillary flowers; and finally in the absence of stipules. They have always appeared to me to be more nearly related to the *Capparideæ* than to any other family, being principally distinguished from them by the quinary arrangement of the petals and lobes of the calyx. In the hypogynous insertion and indefinite number of the stamina, in the inequality of the petals, pendulous ovula, thick, fleshy cotyledons, absence of albumen and stipules, and in the axillary inflorescence, both families agree precisely. In the *Tropaeoleæ* there is likewise an evident indication of the pistilliferous column so conspicuous in *Capparideæ*. On comparing this family with the *Hippocastaneæ* many striking analogies present themselves; such, for example, as the quinary arrangement of the petals and lobes of the calyx, the absence of symmetry between the stamina and other parts of the flower, in the structure of the ovarium, which in both is formed by the union of three, mostly monospermous carpels, in the absence of albumen, in the structure of the embryo, having large, thick cotyledons, which become united as the seed advances towards maturity, with a conspicuous plumule, and a disproportionately small radicle. It is interesting to trace these remarkable coincidences in structure between families, which apparently have no real affinity together: for, although the *Hippocastaneæ* are chiefly distinguished from *Tropaeoleæ* by

their habit, opposite leaves, and terminal inflorescence, I am not disposed to admit that there exists any relationship between them*.

The *Tropæoleæ*, consisting of *Tropæolum*, *Magallana*, and the genus now under consideration, form a small group peculiar to South America, and, as far as we yet know, to the portion of that continent included between the 10th and 48th degrees of S. latitude. The three genera are chiefly distinguished by their fruit, for as far as regards the structure of the flower they are pretty much alike.

I shall now proceed to give the essential character and a detailed description of the genus.

CHYMOCARPUS.

TROPÆOLI sp. Auctt.

Syst. Lim. OCTANDRIA MONOGYNIA.

Ord. Nat. TROPÆOLEÆ, *Juss.*

CHAR. ESSENT. *Calycis aestivatio* valvata. *Petala* 2. *Pericarpium* baccatum!

DESCR. *Calyx* monophyllus, 5-fidus, subbilabiatus; *labio superiore* trilobo, basi calcarato: *lobis* ovatis, subæqualibus, æstivatione valvatis! *Petala* 2, minima, in labio superiore, spathulata, integerrima. *Stamina* 8, hypogyna, inæqualia: *filamenta* subulata, basi dilatata: *antheræ* obtusæ, tetragonæ, biloculares: *loculis* parallelis, connatis, turgidis: *valvulis* distinctis, involutis, septum constituentibus (subinde antheræ quasi 4-loeulares!) demùm longitudinaliter solutis. *Ovarium* triloculare: *ovulis* solitariis, appensis. *Stylus* triquetèr, glaber. *Stigma* tridentatum: *dentibus* subulatis, recurvis. *Fructus*: bacca sapida, tricocca: *coccis* monospermis, abortu sæpè solitariis, subglobosis, lævibus.

Herba (Bonariensis) *scandens*, *radice tuberosâ*, *perenni*. *Caules filiformes*, *glabri*, *purpurascens*. *Folia alterna*, *petiolata*, *quinato-partita*: *segmentis elliptico-oblongis*, *obsoletè mucronulatis*, *integerrimis*, *membranaceis*, *subtùs glaucis*, *venis atropurpureis*, *pollicaribus*, *basi angustatâ substipitatis*; *intermediis longioribus*. *Petoli filiformes*, *glabri*, *bipollicares*, *virides*, *plerumque flexu-*

* Since these observations were written, I have seen a learned memoir by Professor Røper of Basle, intitled, "De floribus et affinitatibus Balsaminearum," in which that acute botanist has also noticed the striking analogies between the *Hippocastaneæ* and *Tropæoleæ*. The latter family he follows Jussieu and others in placing near to the *Geraniaceæ*.

oso-convoluti, cirrhum mentientes. Flores axillares, solitarii, longè pedunculati, contorsione pedunculi sæpè resupinati. Pedunculi assurgentes, filiformes, erubescens, 3-unciales. Calyx: tubo erubescenti: limbo viridi, intùs punctis lineolisque sanguineis notato. Petala punicea. Bacca pulposa, atroviolacea, sapore dulci gratissimo, magnitudine et figurá ferè Uvæ minoris.

1. *C. pentaphyllus.*

Tropæolum pentaphyllum. Lam. Dict. i. p. 612. Illustr. t. 177. Willd. Sp. Pl. ii. p. 299. Persoon Syn. i. p. 405. Smith in Rees Cyclop. in loco. DeCand. Prodr. 1. p. 684. St.-Hil. Pl. Usuel. Bras. t. 41. Grah. in Bot. Mag. t. 3190. Lindl. in Bot. Reg. t. 1547.

T. quinatum. Hellen. Diss. de Tropæolo, p. 20, cum tabulá.

Habitat in Agri Bonariensis locis arenosis (Commerson, Tweedie); in regionibus Cisplatinis. A. de St.-Hilaire, Sello. 4. (v. v. c. et s. sp. in Herb. Linn. fil. et Lamb.)

The name is derived from *χυμος*, *succus*, and *καρπος*, *fructus*, in allusion to the juicy nature of the fruit, which forms so remarkable a peculiarity in this genus.

In the calyx, both of *Tropæoleæ* and *Capparideæ*, that variety of imbricate æstivation generally obtains which is termed equitant, the anterior and posterior lobes, which are also most frequently the largest, overlapping and inclosing the lateral ones. The petals in both families are often unequal, lobed and unguiculate; and the anthers adnate, erect, tetragonal, having prominent valves, with involute edges, so as to give them the appearance of being composed of four cells. In habit *Cleome* and *Tropæolum* are not unlike; the leaves in both are peltately lobed; and in *C. violacea* and in the genus *Cleomella* the flowers are strictly axillary and solitary; and were it not that there is a scandent species of *Cleome*, namely, *C. longipes* of DeCandolle, the climbing habit of *Tropæolum* might have been urged against the approximation of the two families. In the flowers of some species of *Cleome*, such, for example, as *C. gigantea*, particularly in the bud state, a considerable gibbosity is apparent at the base of the calyx, which may be regarded as an indication of a spur. On the leaves of *Cleome glandulosa* similar glands occur to those which are observed in *Magallana*, in which genus, it is to be remarked, the ovarium is biocular, and the stigmata consequently reduced to two.

In *Tovaria*, a genus clearly referrible to *Capparideæ*, the stamina vary from 6 to 9, the stigma is 8-cleft, and the fruit is a round, sessile berry. In the neighbouring group of *Resedaceæ* the stamina are also variable in number, and the stigmata are 3 or 4.

In the *Geraniaceæ*, as has been well remarked by that accurate observer M. Auguste de Saint-Hilaire, the same variety of æstivation occurs as in *Tropæoleæ*; but in the former the styles are simply united, and the anthers incumbent, being attached to the filaments by their middle, with compressed parallel cells, united by a linear connectivum. The stigmata are filiform and pruinose, and the insertion of the stamina rather perigynous than hypogynous. These circumstances, together with what has already been advanced, have led me to dissent from the opinion of some of the most eminent authorities in systematic botany, regarding the affinities of *Tropæoleæ*, whose proper station, I am fully persuaded, is near to the *Capparideæ* and *Cruciferæ*.